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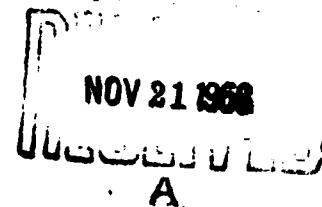
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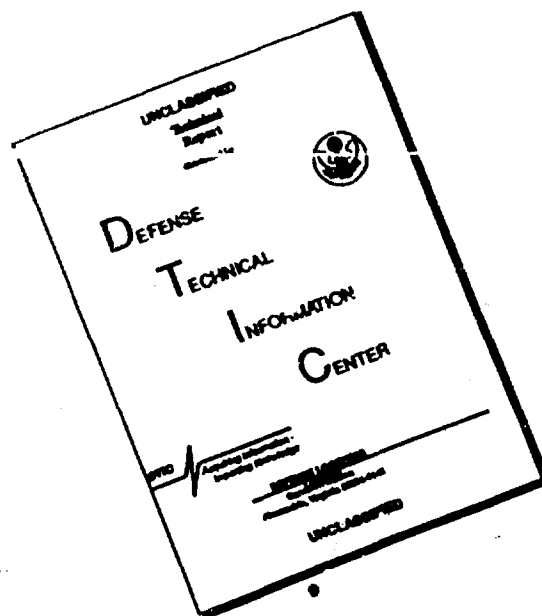
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DESCRIPTION OF SUSCEPTIBILITY OF WHEAT SPECIMENS FROM THE
WORLD COLLECTION OF VIR [All-Union Institute of Plant Growing] TO BREEDS
OF STEM AND BROWN MILDEW [rust]
(Methodological Aids for Breeders)

Kharakteristika porazhayemosti rasami buroy
i stblevoy rzhavchiny obraztsov pshenits
iz mirovoy kolleksii VIR (Metodicheskoye
posobiye selektsioneram) (English
version above),

USSR Ministry of Agriculture, All-Union
Scientific Research Institute of
Plant Protection, All-Union Scientific
Research Institute of Plant Growing
Leningrad, 1963, pages 1-83

Ye.G. Rassadina,
V.V. Shopina,
and
M.M. Yakubtsiner

Introduction

Wheat breeding for resistance to mildew breeds can be more effective if resistant varieties and forms are used as initial parent pairs for crosses.

Under the conditions prevailing at our breeding and experimental institutions the work on creation of resistant varieties with consideration of susceptibility of initial forms is not conducted by everyone and at all institutions by far.

At the present level, breeding for resistance to diseases is being conducted by many without due consideration of intraspecific variability of the parasite, without knowledge of the breed composition of the pathogen, its distribution in different zones. All this reduces to a significant extent the effectiveness of work on producing resistant varieties and hybrids.

At the Laboratory of Immunity of VIZR (All-Union Institute of Plant Protection) work has been in progress for a number of years for

identification of resistant original wheat specimens from the world collection of VIR with respect to brown and stem mildew. These studies are being pursued with due consideration of the distribution of different breeds in the country, their aggressiveness and spectra of action.

The work was done with specially selected specimens of spring and winter wheat (totalling 830 specimens) suitable for use in different zones of the country. These specimens were selected by the head of the VIR wheat section, M.M. Yakubtsiner, with due consideration of their geographic origin, diversity of botanical composition and ecological characteristics. They included wheat referable to the main species: *Triticum aestivum* and *Tr. durum*. In addition rare species were also included: *Tr. turgidum*; *Tr. compactum*, *Tr. polonicum*, *Tr. carthlicum*, *Tr. turanicum*, *Tr. aethiops*, *Tr. macha*, *Tr. spelta* and others.

This collection includes many varieties of spring wheat released to different rayons in different zones and republics of the USSR, a number of domestic local and breeding varieties, and diverse foreign initial breeding material.

A study of the breed composition of brown and stem mildew of wheat in our country enabled us to discover breeds with a broad spectrum and breeds that may grow in the next few years in view of the addition of new varieties of wheat.

We found that the following breeds of brown mildew may be of importance on the territory of our country: 77, 113, 116, 80, 91, 82. The following breeds may be significant in the next few years: 65, 47, 115, 125. The following are widespread breeds of wheat stem mildew: 15, 40, 126; the breeds that may grow in the future are 21, 100. The above-mentioned breeds of brown mildew are distributed in the following zones:

- 77 -- everywhere;
- 82 -- in Kievskaya and Moskovskaya oblasts, Moldavian SSR, Lithuanian SSR and North Ossetian Autonomous SSR;
- 91 -- in almost all oblasts of Ukrainian SSR, Moldavian SSR, Tselinnyy Kray and Moskovskaya Oblast;
- 113 -- Moskovskaya, Novosibirskaya, Omskaya, Sverdlovskaya oblasts;
- 116 -- Krasnodarskiy Kray, Odesskaya, Poltavskaya, Stanislavskaya, Kievskaya, Voronezhskaya, Rostovskaya oblasts, Moldavian SSR, Dagestan Autonomous SSR;
- 65 -- Krasnodarskiy Kray, Odesskaya, Omskaya, Volgogradskaya oblasts, Kirgiz SSR, Moldavian SSR, Azerbaydshan SSR, North Ossetian Autonomous SSR;
- 47 -- Sverdlovskaya and Krymskaya oblasts, Uzbek SSR, Armenian SSR, Kirgiz SSR;
- 115 -- Krasnodarskiy Kray, Krymskaya Oblast, Tselinnyy Kray, Lithuanian SSR;

125 -- Kievskaya, Saratovskaya and Volgogradskaya oblasts, Lithuanian SSR, Moldavian SSR, Kirgiz SSR.

Wheat stem mildew breeds are distributed in the following zones:

- 15 -- Ukrainian SSR, Moldavian SSR, Dagestan Autonomous SSR; Krasnodarskiy Kray, Permskaya Oblast;
- 126 -- Krasnodarskiy Kray, North Ossetian Autonomous SSR, Orlovskaya and Kustanayskaya oblasts;
- 100 -- Moldavian SSR, Dal'nevostochnyy, Primorskiy, Altayskiy, Krasnodarskiy krays, Mogilevskaya and Vinnitskaya oblasts;
- 40 -- Khabarovskiy, Altayskiy and Krasnodarskiy krays, Dnepropetrovskaya and Tselinogradskaya oblasts;
- 21 -- Moldavian SSR, Azerbaydzhan SSR, Krasnodarskiy Kray, Novosibirskaya, Leningradskaya, Kustanayskaya and Krymskaya oblasts.

In view of the difference in nature of susceptibility of the same wheat sample to different breeds it is necessary to know exactly the degree of resistance of forms involved in crosses to each breed individually. On this basis, we determined the resistance of all selected specimens individually to all of the above-mentioned breeds of brown and stem mildew.

Determination of resistance was made using artificial infection at the following stages: shoots and lactic maturity. Resistance was determined according to the following immunity scales: Jackson and Mayns for brown mildew, and Steckman and Levin for stem mildew.

Following are the characteristics of these scales:

type (points)	4	-- very susceptible varieties [strains];
"	"	3 -- moderately susceptible varieties;
"	"	2 -- mildly susceptible varieties;
"	"	1 -- resistant varieties;
"	"	0 -- highly resistant (immune) varieties;
"	"	X -- heterogeneous type of susceptibility (unestablished resistance).

As a result of the work conducted it was possible to characterize the resistance of a large group of wheats (the list is attached).

The list indicates that most of the specimens (88.7%) are referable to the group of markedly and moderately susceptible to all of the tested breeds of both species of mildew. Only a few (12.3%) were mildly susceptible and even fewer (3%) were immune.

In addition to specimens manifesting resistance or susceptibility to the entire set of pathogen breeds we also found some that are susceptible

to some breeds and not to others. Such specimens are also of interest for breeding work. Knowing the distribution of pathogen breeds one can select specimens for crosses that are not susceptible to the breeds encountered in the zone of breeding the variety.

V.V. Whopina (VIZR) conducted the work on determination of breed composition of brown mildew and characteristics of wheat resistance to breeds of this pathogen, Ye.G. Rassadina (VIZR) conducted similar work with respect to stem mildew, under the supervision of the head of the VIZR laboratory of immunity, Professor T.I. Fedotova, Doctor of Agricultural Sciences. M.M. Yakubtsiner (VIR) classified the initial material according to ecological groups.

[Key to Table beginning on source pages 8-9]

Column 1 -- VIR catalogue No
Column 2 -- variant
Column 3 -- variety [strain]
Column 4 -- origin
Columns 5 through 13 -- breeds of brown mildew
Columns 14 through 18 -- breeds of stem mildew

Column 3

Column 4

WHEAT VARIETIES RELEASED TO USSR RAYONS

Soft spring Wheat

Akmolinka I	Kazakh SSR, VNIIZKh [All-Union Scientific Research Institute of Grain Crops]
Apu	Finland
Albidum 43	Scientific Research Institute of Agriculture of the South-East
Local Babilo	Tadzhik SSR
Bashkurskaya 4	Bashkir Autonomous SSR
Vatan	Uzbek SSR
Galgoloc	Armenia SSR
Garnet	Canada
Grashuchyay	Lithuanian Scientific Research Institute of Agriculture
Diamant	Sweden
Iroda 1006	Tadzhik Scientific Research Institute of Agriculture
Kazakhstanskaya 126	Kazakhstan Scientific Research Institute of Agriculture
Karagandinskaya	Karagandinskaya Oblast Agricultural Experimental Station
Leda	Krasnoyarsk Scientific Research Institute of Agriculture
Lutescens 62	Scientific Research Institute of Agriculture of the South-East

source pages 8-9 continued]

column 3

column 4

Lutescens 801

Kinel'sk. Breeding Station

Lutescens 1729

Krasnoyarsk Scientific Research
Institute of Agriculture

source pages 10-11]

Milturum 321

SibNIISKhoz [Siberian "Order of Red
Banner of Labor" Scientific Research
Institute of Agriculture]

Milturum 553

" " " " "

Moskovka

Scientific Research Institute of
Agriculture of Central Nonchernozem
Zone Rayons

Odesskaya 13

All-Union Breeding and Genetics
Institute

Saratovskaya 36

Scientific Research Institute of
Agriculture of the South-East

Sarrubra

" " " "

Smena

SibNIISKhoz

Surkhak 5688

Tadzhik Scientific Research Institute
of Agriculture

Sary-Biday

Kazakh SSR, Chimenteskaya Oblast

Caesium 94

SibNIISKhoz

Caesium III

"

Yakutanka 224

Yakutsk Scientific Research Institute
of Agriculture

Hard Spring Wheat

Hordeiforme 10

SibNIISKhoz

Kustanayskaya 14

Kustanay State Agricultural Experi-
mental Station

Melanopus 69

Krasnokutsk Breeding Station

Chernokoloska

SibNIISKhoz

[source pages 10-11, continued]

column 3

column 4

Soft Winter Wheat

Alborubrum 22308	Krasnovodopadskaya State Breeding Station
Arazbugdasy	Azerbaydzhan Scientific Research Institute of Agriculture
Batkan krasnaya	Przheval' Experimental Field

[source pages 12-13]

Local Vysokolitovskaya	Belorussian SSR
Hostianum 237	Scientific Research Institute of Agriculture of the South East
Graecum 433	Krasnovodopadsk State Breeding Station
Karmir Silfaat, local	Armenian SSR
Milturum pererod	Orlovskaya oblast
Odesskaya 3	All-Union Breeding and Genetics Institute
Rye-wheat hybrid 46/131	Scientific Research Institute of Agriculture of the South-East
Stepnaya 135	Scientific Research Institute of the Central Chernozem Zone
Turcicum, local	Nakhichevan Autonomous SSR
Turcicum 57	former expansion unknown Turkmen Breeding Station
Ukrainka	Mironov ^{skiy} Experimental Breeding Station
Ferrugineum 9704/2	Azerbaydzhan Scientific Research Institute of Agriculture

Hard Wheat, Fall Planting

Arandany	Azerbaydzhan Scientific Research Institute of Agriculture
Sary-Bugda	Azerbaydzhan SSR

[source pages 12-13, continued]

column 3

column 4

DOMESTIC SPECIMENS

ECOLOGICAL GROUPS OF SOFT SPRING WHEAT

Volga Steppe

Erythrospermum 341

Scientific Research Institute of
Agriculture of the South-East

" 0./78

" " "

Turcicum 2447

" " "

[source pages 14-15]

Albidum 21

" " "

Lutescens 53/12

" " "

Lutescens 3221

" " "

Saratovskaya 33

" " "

" 35

" " "

Russkaya

Saratovskaya Oblast

"

" "

Poltavka

" "

Amerikanskaya

" "

Poltavka

" "

Chudo

" "

Rusak

Volgogradskaya Oblast

"

" "

Southern Steppe

Girka

Rostovskaya Oblast

"

Stavropol'skiy Kray

Erythrospermum 2260

Stavropol' Experimental Breeding
Station

Lutescens 1163

All-Union Breeding and Genetics
Institute

[source pages 14 -15, continued]

column 3

column 4

Eastern Steppe

Noe Strain Mixture

A₂-47
B-022

**Gracum Chingirlausskiy
Girka**

Omskaya Oblast
Karaganda Agricultural Experimental
Station

11	11	11
11	11	11

Aktyubinskaya Oblast
Ural'skaya Oblast
Alma-Atinskaya Oblast

[source pages 16-17]

Southern Forest-steppe

Milturum 162

Ferrugineum 13

Pionerka Yarovaya Ukrainka

**Ukrainian Scientific Research Institute
of Plant Growing, Breeding, and
Genetics**

Chernovitskaya Oblast
Krasnodar Scientific Research Institute
of Agriculture

Stavropol' Experimental Breeding Station
Alma-Ata Breeding Station

Volga Forest-steppe

Lutescens 1487

"	32
"	35

Gor'kovskaya 15

**Kuybyshevskaya Oblast State Experimental
Agricultural Station**

11	11	11	11
11	11	11	11

**Gor'kiy Experimental Agricultural
Station**

Eastern Forest-steppe

Golubka

Kustanay State Strain Testing Plot Severo-Kazakhstanskaya Oblast

00	00	00	00
01	01	01	01
02	02	02	02
03	03	03	03
04	04	04	04
05	05	05	05
06	06	06	06
07	07	07	07
08	08	08	08
09	09	09	09
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99

Vostochno-Kazakhstanskaya Oblast

[source pages 18-19]

column 3

column 4

Duvanskaya krasnokoloska
Milturum 13

Shadrinka 38
Lutescens 956
Milturum 2078
Lutescens 379

Sibirskaya

Bashkir Autonomous SSR
Altay Scientific Research Institute
of Agriculture
Shadrin Experimental Station
SibNIISKhOZ
"
Novosibirskaya Oblast Experimental
Agricultural Station
Tyumenskaya Oblast

East Siberian Forest-steppe

Kamalinka

Krasnoyarskaya 1103
Urozhaynaya 716

Ferrugineum 960

Krasnoyarsk Scientific Research
Institute of Agriculture
" " "
Yakutsk Scientific Research Institute
of Agriculture
" " " "

Circumpolar

Alen'kaya uluchshennaya

Sibirka 1818
Sibirka Yartsevskaya
B-633
B-624
Sibirka

Altay Scientific Research Institute
of Agriculture
Tulun State Breeding Station
Yartsev Reference [oporny] Center
" " "
" " "
Arkhangel'skaya Oblast

[source pages 20-21]

North Russian Forest

Belorusskaya 525

Velikovskaya
Sibirskaya

Belorussian Scientific Research
Institute of Agriculture
Kostromskaya Oblast
" "
Kirovskaya Oblast
" "
Bryanskaya Oblast
Latvian SSR
Permskaya Oblast

Far Eastern Maritime

Amurskaya golokoloska

Primorskiy Kray
" "
Amurskaya Oblast

[source pages 20-21, continued]

column 3

column 4

Sakhalin

Kaba 135	Sakhalin Base of USSR Academy of Sciences
Klon 244	" " " " "
" 209	" " " " "
Akatsuki	" " " " "
Minaminasi	" " " " "
Khoku 220	" " " " "
Khon 240	" " " " "
Karafuto 2	" " " " "
" 3	" " " " "
Khoku 130	" " " " "
Kaba 105	" " " " "
" 115	" " " " "
Local 117	" " " " "

[source pages 22-23]

Column 2

Armenian-Nakhichevan (steppe) Caucasian Mountain Region

population
"

Armenian SSR
" "

Central Asian Bogar [dry] Region

Pseudoturcicum 2115
Graecum 289
Erythrospermum 5437
Terema

Krasnovodopad State Breeding Station
" " " "
Burnensk Experimental Field
Kazakh SSR
Yuzhno-Kazakhstanskaya Oblast
Uzbek SSR
" "

Bokhary
Erythrospermum 5/55

Milyutin State Breeding Station

Central Asian Lowlands (irrigated)

population

Kizyl-Bugday
Andizhanskaya
Sary-Biday
Erythrospermum 5437

Turkmen SSR
Khorezmskaya Oblast
Uzbek SSR
Chikmentskaya Oblast
Dzhambulskaya Oblast

High Altitude Central Asian

Tadzhik SSR
" "
" "
" "
" "
" "
" "

[source pages 24-25]

column 3

column 4

Tadzhik SSR

" "

Hybrid Siberian Group of Soft Wheats

178-F	Tulun State Breeding Station - VIR
GDS-6	" " " " "
GDS-II	" " " " "
Complex hybrid	" " " " "
9/3	" " " " "
Sibirskaia 1527	Tulun State Breeding Station
Udarnitsa	" " " " "

ECOLOGICAL GROUPS OF HARD SPRING WHEAT

Volga Steppe

Astrakhanskaya

Kazakh SSR

Eastern Steppe

Kirgiz SSR

Southern Steppe

Arnautka

Ukrainian SSR

Mediterranean Falcate

Ioanna

Belorussian SSR

[source pages 26-27]

ECOLOGICAL GROUPS OF SOFT WINTER WHEAT

Volga Steppe

Lutescens 329

Scientific Research Institute of
Agriculture of the South-East

Southern Forest-steppe

Lesostepka 75
Zernogradka
Baatka

Belotserkov Experimental Breeding Station
Zernograd Breeding Station
Kalininskaya Oblast

[source pages 26-27, continued]

column 3

column 4

North Russian Forest

Akuotuotey

Yaranka
Mos-4

Lithuanian Scientific Research
Institute of Agriculture
Falen Breeding Station
Scientific Research Institute of
Agriculture of the Central Rayons
of the Nonchernozem zone
Kaliningradskaya Oblast Experimental
Agricultural Station

Strain mixture

Ivanovo Experimental Breeding Station

Forest-steppe of Mountainous Caucasus

Dzali-Sura 35/3

Georgian Experimental Breeding Station
Dagestan Autonomous SSR

[source pages 28-29]

Mountainous Caucasus Steppe

Armenian SSR
Nakhichevan Autonomous SSR

Subtropical Mountainous Caucasus

Rachula
Tekhumari

Georgian Experimental Breeding Station
Georgian SSR

Central Asian Lowlands (irrigated)

Meridionale 77
Kirgizskaya 72
Kara-Kel'tek

~~Former~~ Turkmen Breeding Station
Kirgiz Scientific Research Institute
of Agriculture
Uzbek SSR

Dagestan-Azerbaydzhan

Nagorno-Karabakhskaya Autonomous Oblast

ECOLOGICAL GROUPS OF HARD WHEAT SOWN IN THE FALL

Dagestan-Azerbaydzhan

Chay-bugday
Kanadka

Tselinnaya Kazakhstanskaya
Chaza

Dagestan Autonomous SSR
Azerbaydzhan SSR
Nakhichevan Autonomous SSR
Kazakh SSR
Georgian SSR

[see pages 36-37]

column 2

column 3

column 4

Central Asian (Kashgarian)

population Ak-Biday
Kul'zhinskaya
Ak-Mekke

Mongolian

population Mongolia
"
"

Far-Eastern (Manchurian)

China
"
"
"
Lyagonskaya
"

Japanese

Japan
"
"
"
"

source pages 38-39]

Central Asian

Afghanistan

"
"
"
"
"
"

Iran

"
"
"
"

Shakhrud
Zarand
Gendum Abi

Anatolian

Turkey

"
"
"
"

population

population

"

[source pages 38-39, continued]

column 2

column 3

column 4

population

Damarskaya

[source pages 40-41]

Near Eastern

Irak
Syria
Israel
"
Saudi Arabia
Yemen
"

United Arab Republic

" " "
" " "

Mediterranean

Morocco
"
Algeria
"
Eritrea
"
Sardinia
Greece

Pyrenees

Spain
"
"
Portugal

Danube Region

Austria
"
"
Romania
Czechoslovakia
"

[source pages 42-43]

population

Bulgaria
Yugoslavia
Hungary
"

[source pages 42-43, continued]

column 2

column 3

column 4

North-European

Finland

"
"
"

Circumpolar

USA (Alaska)

Switzerland

Andes

Chile

"
"
"
"
"
"
"
"
"
"
"

Peru

"
"

Uruguay

Brazil

"
"

Mexico

"
"
"
"

[source pages 44-45]

HYBRID GROUPS OF SOFT SPRING WHEAT

Kenyan

Kenya

"
"
"
"
"

[source pages 44-45, continued]

column 3

column 4

Appenines

San Marino

"

Italy

"

"

[source pages 46-47]

"

"

Polish

Poland

"

"

"

Scandinavian

Sweden

"

Finland

"

Denmark

West European

German Democratic Republic

"

"

"

"

"

"

"

"

"

France

"

"

North American

Canada

"

"

"

"

[source pages 48-49]

"

"

"

"

"

"

"

"

"

"

"

"

"

"

[source pages 48-49, continued]

column 3

column 4

Kitayskaya [Chinese]	Canada
Kitayskaya x krasnaya yegipetskaya	"
[Chinese X Red Egyptian]	"
"	"
"	"
Berostaya [awnless] 609	"
Ostistaya [awned] 609	"
	"
	"
	"
	"

USA

D.S.
D.S. 1664

[source pages 50-51]

Hybrid H44
D.S. II

Argentinian

Argentina

Complex hybrid

[source pages 52-53]

column 2

column 3

column 4

Argentina [repeated for 22 more lines]

Australian

Australia

" [repeated for 6 more lines]

[source pages 54-55]

Australia

" [for 9 lines]

Republic of South Africa

" " "

ECOLOGICAL GROUPS OF HARD SPRING WHEAT

Near Eastern

Jordan

"

population

"

Israel

"

"

"

Syria

"

population

"

"

"

"

Arabi

Iran

Iran

"

[source pages 56-57]

United Arab Republic

Malta

Cypriote

population

Cyprus

"

"

"

"

"

"

Kilikiyevskaya [?]

Kara Kylchik

Turkey

[source pages 56-57, continued]

column 2

column 3

column 4

Egyptian

population

United Arab Republic

" " "

East Mediterranean

population

Algeria

"

"

Tunisia

"

"

Morocco

"

Republic of South Africa

" " "

[source pages 58-59]

West Mediterranean

population

Italy

"

"

"

population

"

"

"

"

"

Mediterranean (Falcate)

Pangelos
Goloshan'

"

Portugal

Morocco

Syria

Crete

China (Hsinchiang)

"

"

Balkans

Greece

"

Albania

"

"

Turkey

"

"

Yery buday

Rhodes

[source pages 60-61]

column 2

column 3

column 4

Pyrenees

Portugal
" [3 times]
Spain

Hindustanian

India
"

Chinese

China
"

Andean

Uruguay
Peru
Chile
"
"

HYBRID GROUPS OF HARD SPRING WHEAT

North-African

Tunisia

North American

USA
" [3 times]

Different Forms

population

USA
"

[source pages 62-63]

Australia
France
Czechoslovakia
Mongolia

[source pages 62-63, continued]

column 2

column 3

column 4

ECOLOGICAL GROUP OF SOFT WINTER WHEAT

Central Asian (Kashgara)

	Vali belaya	China
	Ak. chuschi	"
population	Kizma-Kyuzga	"
		"
population		"
"	Kara-basman	"
	Krasnaya [red]	"
	Touchan belaya [white]	"
	Yarkendskaya	"
		"
		"
population		"
"		"
		"

[source pages 64-65]

Kashmir

India

Iranian

	Kusse	Iran
population		"
"		"

East Asian

Ten-yuk 15

Korean People's Democratic Republic
Japan
"

Mediterranean (large grain)

Italy

[source pages 64-65, continued]

column 2

column 3

column 4

Balkans

population

Bulgaria

"

"

"

"

"

"

"

"

"

"

prevalence

of lutescens

"

population

"

"

"

"

"

"

"

"

"

[source pages 66-67]

population

"

"

"

prevalence of

ferrugineum

"

"

"

population

"

prevalence of

erythrosporum

"

"

"

"

"

"

"

population

"

"

"

prevalence of

erythrosporum

"

population

"

" [13 lines]

" [13 lines]

[source pages 68-69]

population

Bulgaria

" [6 lines]

" [6 lines]

prevalence of

erythrosporum

"

population

"

prevalence of

lutescens

"

Yubileynaya [jubilee] II

"

[source pages 68-69, continued]

column 2

column 3

column 4

	Greece
	Yugoslavia
Bochka	"
	"
Bela	"
P-53	"
Zhuzhitsa belaya	Albania

Alps

Switzerland
"

Danube Region (Forest-steppe)

	Hungary
	"
Teyskaya	Rumania
Tsioneshti	"
	Czechoslovakia
	Austria

[source pages 70-71]

HYBRID GROUPS OF SOFT WINTER WHEAT

Appenines

Italy
" [4 lines]

West-European

German Democratic Republic
" [5 lines]
Belgium
Holland
" [3 lines]
France
" [3 lines]

Scandinavian

Norway
Sweden

[source pages 72-73]

South American

Argentina
Chile

[source pages 72-73 continued]

column 2

column 3

column 4

Different Forms

USA

"

Canada

Tunisia

Poland

Spain

"

France

"

Hard Winter Wheats

Romania

"

Yugoslavia

"

"

Bulgaria

"

"

"

"

"

"

"

"

"

"

Karabashak

population

"

Karabashak

Chirpak 13

prevalence of

hordeiforme

prevalence of

murciense

[source pages 74-75]

prevalence of

hordeiforme

"

"

prevalence of

murciense

population

prevalence of

hordeiforme

"

Barani 2

Albania

"

"

Iran

[source pages 74-75, continued]

column 2

column 3

column 4

RARE HEXAPLOID SPECIES OF SPRING WHEAT

Dwarf Wheat (Tr. compactum Host)

Rostovskaya Oblast
Turkey
Israel
China

[source pages 76-77]

" [5 lines]
German Federal Republic

Tr. Spelta L.

Switzerland
"
Spain
"
"
German Democratic Republic
L'vovskaya Oblast

RARE TETRAPLOID SPECIES OF SPRING WHEAT

Tr. turanicum Jakubz.

Migri bugda

Uzbek SSR
Dagestan Autonomous SSR
Kirgiz SSR
Tadzhik SSR
Turkey
Iran

Ethiopian Wheat (Tr. aethiopicum Jakubz.)

Ethiopia
" [4 lines]
Yemen

[source pages 78-78]

Persicum Wheat (Tr. carthlicum Nevski)

Armenian SSR
Dagestan Autonomous SSR
Georgian SSR
"
North Ossetian Autonomous SSR

{source pages 78-79, continued}

column 2

column 3

column 4

Tr. Turgidum L.

Ak biday
Kakhetinskaya vetvistaya

Kazakh SSR
Georgian SSR
Turkey
Syria
Crete
Spain
" [3 lines]
Portugal
"
Italy
Algeria
Chile
China
"

population

Lao-Pai-p'i

Tr. polonicum L.

Kazakh SSR
Georgian SSR
Adygeyskaya Autonomous Oblast

[source pages 80-81]

Israel
"
"
Turkey
Cyprus
Ethiopia
German Democratic Republic

Wild Spelt (dicoccoides schweinf.)

Israel

RARE HEXAPLOID SPECIES OF WINTER WHEAT

Dwarf Wheat (Tr. compactum Host)

Turkmenian
China
" [3 lines]
Chile
"
German Federal Republic

[source pages 80-81, continued]

column 2

column 3

column 4

Tr. macha Dek. et Men.

Georgian SSR

" " [5 lines]

[source pages 82-83]

Spelt (Tr. spelta L.)

Austria

"

RARE TETRAPLOID SPECIES OF WINTER WHEAT

Turgidum Wheat (Tr. turgidum L.)

Azerbaijdzhan SSR

" " [3 lines]

Georgian SSR

L'vovskaya Oblast

Turkey

Greece

Yugoslavia

Afghanistan

China

Switzerland

German Democratic Republic

Poland

England

Milovskaya

population

Zafrani

Wild Spelt (Tr. dicoccoides schweinf.)

population

Israel